IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	)	
	)	
Heume II BAEK, *et al.*	)	Confirmation No.: 8785
	)	
Application No.: 10/608,187	)	Group Art Unit: 2629
	)	
Filed: June 30, 2003	)	Examiner: J. Piziali
	)	
For: ALIGNMENT METHOD FOR FERROELECTRIC LIQUID CRYSTAL MATERIAL AND LIQUID CRYSTAL DEVICE USING THE SAME	)	**Mail Stop Appeal Brief Patents**

Commissioner for Patents
Mail Stop Appeal Brief Patents
Alexandria, VA 22314

Sir:

APPELLANTS' BRIEF UNDER 37 C.F.R. § 41.37

This brief is in furtherance of the Notice of Appeal filed in the above-identified patent application on May 18, 2010. A fee of $540.00 required under 37 C.F.R. §41.20(b)(2) is being filed concurrently herewith. The period for filing this brief has been extended through December 18, 2010, by a petition for a five-month extension of time filed concurrently herewith.

1. **The Real Party in Interest**

The real party in interest in this appeal is LG. PHILIPS LCD CO., LTD.

2. **Related Appeals and Interferences**

Appellants are not aware of any other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal.

3. **Status of Claims**

The status of the claims is as follows upon filing of this Appeal Brief:

Claims pending: 1, 4, 5, 7-9 and 12-14
Claims objected to: None
Claims allowed: None
Claims withdrawn: 4, 5, 7-9, and 12-14
Claims rejected: 1

The claim on appeal is 1.

4. **The Status of Amendments**

Appellants filed an Amendment under 37 C.F.R. § 1.111 on November 14, 2005 in which claims 6 and 7 were amended.

Appellants subsequently filed a Response to Election of Species Requirement on March 1, 2006 in which Species I, claims 1-3, 6 and 9-12, was elected with traverse.

Appellants subsequently filed a Request for Reconsideration on August 11, 2006 in which the claims were not amended.

Appellants subsequently filed an Amendment for Entry with RCE filing on September 14, 2006 in which claims 1 and 9 were amended.

Appellants subsequently filed an Amendment under 37 C.F.R. § 1.111 on April 10, 2007 in which claims 1 and 9 were further amended.

Appellants subsequently filed an Amendment for Entry with RCE filing on October 15, 2007 in which claims 1 and 9 were amended and claims 3, 6 and 11 were canceled.

Appellants subsequently filed an Amendment under 37 C.F.R. § 1.111 on March 27, 2008 in which claims 1 and 9 were further amended.

Appellants subsequently filed an Amendment under 37 C.F.R. § 1.116 on September 22, 2008 in which claims 1, 9 and 12 were amended and claims 2 and 10 were canceled.

Appellants subsequently filed a Response to Election/Restrictions Requirement on January 30, 2009 in which Group I, claim 1, was elected.

Appellants subsequently filed an Amendment under 37 C.F.R. § 1.111 on July 27, 2009 in which claim 1 was amended.

Appellants subsequently filed a Response to Notice of Non-Compliant Amendment under 37 C.F.R. § 1.121 on November 30, 2009 in which the status identifier of claim 12 was amended.

No further amendments of the claims were made during the prosecution of the subject application up to the filing of the Notice of Appeal on May 18, 2010. As such, Appellants submit that claim 1 is the currently pending claim of record. Claim 1 listed in the claims appendix herein reflect the cumulative claim amendments of the aforementioned Amendments of

November 14, 2005; September 14, 2006; April 10, 2007; October 15, 2007; March 27, 2008; September 22, 2008; July 27, 2009 and November 30, 2009.

5. Summary of Claimed Subject Matter

An aspect of Appellants' present invention relates generally to a method of driving a ferroelectric liquid crystal display device including a liquid crystal panel 62 having a plurality of data lines D1 to Dm, a plurality of gate lines G1 to Gn, a plurality of thin film transistors TFTs arranged in a zigzag configuration along a direction of the data line (one of D1 to Dm) and a ferroelectric liquid crystal material, wherein a plurality of pixels are defined by crossing the gate lines G1 to Gn and the data lines D1 to Dm, and one data line (one of D1 to Dm) is arranged between adjacent pixels.

In accordance with the exemplary embodiment of the invention as recited in independent claim 1, the method includes supplying a plurality of gate voltages to the plurality of gate lines G1 to Gn during an electric field alignment of the ferroelectric liquid crystal material, wherein each of the gate voltages (Vgate) is set at a level higher than a threshold voltage (Vth) of the thin film transistor TFT, the gate voltages (Vgate) are generated in a range of from ten to four-hundred times during the electric field alignment, and each gate voltage (Vgate) is simultaneously supplied to the plurality of gate lines G1 to Gn; supplying a first data voltage for the electric field alignment to the plurality of data lines D1 to Dm in response to each gate voltage (Vgate), wherein a polarity of the first data voltage is inverted every time when the gate voltage (Vgate) is supplied; sequentially supplying a plurality of scan pulses to the plurality of gate lines G1 to Gn during normal driving for image display, wherein each of the scan pulses is

generated for one horizontal period and is supplied to one of the plurality of gate lines G1 to Gn; and supplying a second data voltage for the image display to the plurality of data lines D1 to Dm in response to each scan pulse, wherein a polarity of the second data voltage is inverted every time when the scan pulse is supplied. This aspect of Appellants' invention is described in the specification at, *inter alia*, paragraphs [0064] through [0079] of the published application.

6. Grounds of Rejection to be Reviewed on Appeal

Whether claim 1 is unpatentable under 35 U.S.C. § 103(a) as obvious over Hasegawa et al. (US 6,335,717 B1) in view of Saishu et al. (US 5,949,391 A).

7. Argument

Appellants respectfully assert that the rejections under 35 U.S.C. §103(a) are improper and should be reversed.

A. Independent Claim 1

With respect to independent claim 1, Appellants respectfully assert that the applied art does not teach or suggest a method of driving a ferroelectric liquid crystal display device including a liquid crystal panel having a plurality of data lines, a plurality of gate lines, a plurality of thin film transistors arranged in a zigzag configuration along a direction of the data line and a ferroelectric liquid crystal material, wherein a plurality of pixels are defined by crossing the gate lines and the data lines, and one data line is arranged between adjacent pixels, the method comprising:

supplying a plurality of gate voltages to the plurality of gate lines during an electric field alignment of the ferroelectric liquid crystal material, wherein each of the gate voltages is set at a level higher than a threshold voltage of the thin film transistor, the gate voltages are generated in a range of from ten to four-hundred times during the electric field alignment, and each gate voltage is simultaneously supplied to the plurality of gate lines;

supplying a first data voltage for the electric field alignment to the plurality of data lines in response to each gate voltage, wherein a polarity of the first data voltage is inverted every time when the gate voltage is supplied;

sequentially supplying a plurality of scan pulses to the plurality of gate lines during normal driving for image display, wherein each of the scan pulses is generated for one horizontal period and is supplied to one of the plurality of gate lines; and

supplying a second data voltage for the image display to the plurality of data lines in response to each scan pulse, wherein a polarity of the second data voltage is inverted every time when the scan pulse is supplied.

<u>Rejection of Claim 1 under 35 U.S.C. 103(a) over Hasegawa et al. and Saishu et al.</u>

The Final Office Action alleges that the combination of <u>Hasegawa et al.</u> and <u>Saishu et al.</u> renders the present invention of claim 1 obvious. Appellants respectfully disagree. Appellants respectfully submit that <u>Hasegawa et al.</u> and <u>Saishu et al.</u>, whether taken individually or in combination, fail to teach or disclose at least a claimed combination including at least a feature (1) of "one data line is arranged between adjacent pixels;" a feature (2) of "supplying a plurality of gate voltages to the plurality of gate lines during an electric field alignment of the ferroelectric

liquid crystal material;" a feature (3) of "the gate voltages are generated in a range of from ten to four-hundred times during the electric field alignment, and each gate voltage is simultaneously supplied to the plurality of gate lines;" and a feature (4) of "sequentially supplying a plurality of scan pulses to the plurality of gate lines during normal driving for image display," as recited by independent claim 1.

For example, regarding the above-noted feature (3), in contrast to the present invention of independent claim 1, in Hasegawa et al., each signal Vg is applied to two adjacent scanning lines 24 or scanning lines included in each group. In Saishu et al., each scan signal is applied to one signal line. In other words, Hasegawa et al. and Saishu et al. fail to teach or disclose at the feature (3).

Moreover, as shown in Fig, 10 referring to paragraph [0076] in the present application, if a positive(+) polarity voltage is applied to odd data lines and a negative(-) polarity voltage is applied to even data lines during an electric field alignment of the ferroelectric liquid crystal material, the ferroelectric liquid crystal cells connected to the odd-numbered data lines (D1,D3,…,Dm-1) may be uniformly arranged where the spontaneous polarization (PS) direction becomes parallel with the positive electric field direction. Accordingly, the ferroelectric liquid crystal cells connected to the even-numbered data lines (D2,D4,…,Dm) may be uniformly arranged where the spontaneous polarization (PS) direction becomes parallel with the negative electric field direction. Thus, the spontaneous polarization (PS) direction of the liquid crystal cells aligned under electric field by the negative electric field becomes contrary to each other. Since the TFTs arranged along the data line direction may be connected to the data lines alternately between two data lines, which may be adjacently offset (i.e., zigzag patterned), the

liquid crystal cells aligned under electric field by the positive polarity electric field and the cells aligned under electric field by the negative polarity electric field may be arranged alternately. As a result, an observer may view images without color shifting since the light is aligned along a direction of the long and short axis of the ferroelectric liquid crystal molecules in adjacent liquid crystal cells (Clc) irrespective of viewing angle of the liquid crystal display device.

In view of the foregoing, Appellants respectfully request the reversal of the Examiner's rejections and the allowance of the pending claim. If there are any other fees due in connection with the filing of this Appellants' Brief, please charge the fees to our Deposit Account No. 50-0310.

If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such an extension is requested and the fee should also be charged to our Deposit Account No. 50-0310.

Respectfully submitted,

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8. Claims Appendix

Subsequent to entry of the Response to Notice of Non-Compliant Amendment under 37 C.F.R. § 1.121 on November 30, 2009, the claims read as follows:

Claim 1 (Rejected). A method of driving a ferroelectric liquid crystal display device including a liquid crystal panel having a plurality of data lines, a plurality of gate lines, a plurality of thin film transistors arranged in a zigzag configuration along a direction of the data line and a ferroelectric liquid crystal material, wherein a plurality of pixels are defined by crossing the gate lines and the data lines, and one data line is arranged between adjacent pixels, the method comprising:

supplying a plurality of gate voltages to the plurality of gate lines during an electric field alignment of the ferroelectric liquid crystal material, wherein each of the gate voltages is set at a level higher than a threshold voltage of the thin film transistor, the gate voltages are generated in a range of from ten to four-hundred times during the electric field alignment, and each gate voltage is simultaneously supplied to the plurality of gate lines;

supplying a first data voltage for the electric field alignment to the plurality of data lines in response to each gate voltage, wherein a polarity of the first data voltage is inverted every time when the gate voltage is supplied;

sequentially supplying a plurality of scan pulses to the plurality of gate lines during normal driving for image display, wherein each of the scan pulses is generated for one horizontal period and is supplied to one of the plurality of gate lines; and

supplying a second data voltage for the image display to the plurality of data lines in response to each scan pulse, wherein a polarity of the second data voltage is inverted every time when the scan pulse is supplied.

Claims 2 and 3 (Canceled).

Claim 4 (Withdrawn): An electric field alignment method of a ferroelectric liquid crystal display device, comprising:

connecting a plurality of thin film transistors arranged along a first direction to a plurality of data lines arranging in an offset configuration between adjacent data lines;

supplying a voltage below a threshold voltage of the thin film transistors to a plurality of gate lines during an electric field alignment of ferroelectric liquid crystal material of the ferroelectric liquid crystal display device; and

supplying voltages of opposite polarity to adjacent data lines during the electric field alignment while maintaining a voltage of a ferroelectric liquid crystal cell of the ferroelectic liquid crystal display device during the electric field alignment.

Claim 5 (Withdrawn): The electric field alignment method according to claim 4, wherein the ferroelectric liquid crystal cell operates in a Half V-Switching Mode.

Claim 6 (Canceled).

Claim 7 (Withdrawn): An electric field alignment method of a ferroelectric liquid crystal display device, comprising:

connecting a plurality of thin film transistors arranged along a first direction to a plurality of data lines in an offset configuration adjacent data lines;

maintaining a plurality of gate lines in an electrically floating state during an electric field alignment of a ferroelectric liquid crystal material of the ferroelectric liquid crystal display device; and

supplying voltages of opposite polarity to the adjacent data lines during the electric field alignment while maintaining a voltage of a ferroelectric liquid crystal cell of the ferroelectric liquid crystal display device during the electric field alignment.

Claim 8 (Withdrawn): The electric field alignment method according to claim 7, wherein the ferroelectric liquid crystal cell operates in a Half V-Switching Mode.

Claim 9 (Withdrawn): A ferroelectric liquid crystal display device, comprising:

a liquid crystal panel having a plurality of data lines, a plurality of gate lines and a plurality of thin film transistors arranged in a zigzag configuration between adjacent data lines of the data lines and having a ferroelectric liquid crystal material;

a gate driving circuit for supplying a gate voltage to the plurality of gate lines, the gate voltage set at a level above a threshold voltage of the thin film transistors during an electric field alignment of the ferroelectric liquid crystal material, the electric field alignment of the ferroelectric liquid crystal material is performed in a period that the

ferroelectric liquid crystal material is transitioned from a nematic phase to a smectic phase, wherein the gate voltage is supplied to the gate lines in a range of from ten to four-hundred times during the electric field alignment of the ferroelectric liquid crystal material; and

a data driving circuit for inverting a polarity of a data voltage for the electric field alignment every time when the gate voltage is supplied to the gate lines and supplying the inverted data voltage for the electric field alignment to the data lines,

wherein an electric field generated from the inverted data voltage is applied to the ferroelectric liquid crystal material by using a leakage current of the thin film transistors.

Claims 10 and 11 (Canceled).

Claim 12 (Withdrawn): The ferroelectric liquid crystal display device according to claim 9, wherein the data driving circuit supplies data voltage for displaying image having different polarities to the adjacent data lines during driving of the display device.

Claim 13 (Withdrawn): A ferroelectric liquid crystal display device, comprising:

a liquid crystal panel having a plurality of data and gate lines and a plurality of thin film transistors arranged along a first direction in an offset configuration between adjacent data lines;

a gate driving circuit for supplying a voltage below a threshold voltage of the thin film transistors to the gate lines during an electric field alignment of ferroelectric liquid crystal material of the display device; and

a data driving circuit for controlling opposite polarity voltages supplied to the adjacent data lines during the electric field alignment while maintaining a voltage supplied to a ferroelectric liquid crystal cell during the electric field alignment.

Claim 14 (Withdrawn): A ferroelectric liquid crystal display device, comprising:

a liquid crystal panel having a plurality of data and gate lines and a plurality of thin film transistors arranged along a first direction in an offset configuration between adjacent data lines; and

a data driving circuit for controlling opposite polarity voltages supplied to the adjacent data lines during an electric field alignment while maintaining a voltage supplied to a ferroelectric liquid crystal cell during the electric field alignment,

wherein the gate lines remain electrically floating during the electric field alignment.

9. Evidence Appendix

No information is appended under this section.

10. Related Proceedings Appendix

No information is appended under this section.